

What is claimed is:

- 1) A process for evaluating the performance of a plurality of solid particle catalysts comprising:
 - a) containing the plurality of solid particle catalysts in an array of parallel
5 reactors with each reactor containing a bed of catalyst;
 - b) contacting, simultaneously, at reaction conditions and two-phase operating conditions, each bed of catalyst with at least one fluid reactant to form an effluent of each reactor;
 - c) independently controlling, simultaneously, the space velocities of a
10 plurality of fluid streams, each said stream contacting at least one associated bed of catalyst resulting in the reactors containing a fluidized bed of solid particle catalyst, wherein said fluid is selected from the group consisting of the reactant, another fluid, or a mixture thereof; and
 - d) analyzing each of the effluents to determine its chemical composition.
- 15 2) The process of Claim 1 wherein at least two reactors or two sets of reactors each independently have at least one associated flow control device to control fluid flow to the reactor or set of reactors.
- 3) The process of Claim 1 further comprising loading, simultaneously, the plurality of solid particle catalysts into the array of parallel reactors.
- 20 4) The process of Claim 1 further comprising unloading, simultaneously, the plurality of solid particle catalysts into the array of parallel reactors.
- 5) The process of Claim 1 wherein each reactor comprises at least a top and a bottom, said process further comprising sealing, simultaneously, the tops and the corresponding bottoms of the array of parallel reactors.
- 25 6) The process of Claim 5 further comprising unsealing, simultaneously, the tops and the corresponding bottoms of the array of parallel reactors.
- 7) The process of Claim 1 wherein the flow of reactant introduced to each individual bed of catalyst is measured.
- 8) The process of Claim 1 further comprising determining a characteristic of
30 each catalyst selected from the group consisting of activity, selectivity, yield, deactivation rate, deactivation trends, and combinations thereof.

- 9) The process of Claim 8 further comprising comparing the selected characteristic of each of the catalysts in the plurality.
- 10) The process of Claim 1 further comprising measuring the temperature within the fluidized catalyst bed.
- 5 11) The process of Claim 1 wherein the array of reactors contains a number of reactors selected from the group consisting of 6, 8, 12, 24, 48, 96, 384, and 1264.
- 12) The process of Claim 1 wherein each effluent is analyzed by an analytic technique selected from the group consisting of spectroscopy,
10 chromatography, nuclear magnetic resonance, and combinations thereof.
- 13) The process of Claim 1 further comprising sampling, simultaneously, each of the effluents periodically prior to analyzing.
- 14) The process of Claim 1 further comprising sampling, simultaneously, each of the effluents prior to analyzing.
- 15 15) The process of Claim 1 wherein the effluents are continuously analyzed.
- 16) The process of Claim 1 wherein the plurality of catalysts contains multiple different catalyst formulations.
- 17) The process of Claim 1 wherein the beds of catalysts contain different ratios of a mixture two or more catalysts.
- 20 18) The process of Claim 1 wherein the catalyst bed comprises from about 1 mg to less than one gram of catalyst.
- 19) The process of Claim 1 further comprising, after containing the plurality of catalysts in the array of parallel reactors, ramping the superficial velocity of the reactant while monitoring the effluents to define, for each bed of catalyst,
25 a range of superficial velocities which result in fluidization of the beds of catalyst.
- 20) A process for evaluating the performance of a plurality of solid particle catalysts comprising:
- a) containing the plurality of solid particle catalysts in an array of parallel
30 reactors with each reactor containing a bed of catalyst;

- b) contacting, simultaneously, at reaction conditions and two-phase operating conditions, each bed of catalyst with at least one fluid reactant to form an effluent of each reactor;
 - c) maintaining the actual temperature of the solid catalyst particles in the plurality of beds at a common desired temperature regardless of differences between beds by fluidizing each bed of catalyst using a fluid selected from the group consisting of said reactant, another fluid, or a mixture thereof; and
 - d) analyzing each of the effluents.
- 21) A process for evaluating the performance of a plurality of solid particle catalysts comprising:
- a) containing the plurality of solid particle catalysts in an array of parallel reactors with each reactor containing a bed of catalyst;
 - b) contacting, simultaneously, at reaction conditions and two-phase operating conditions, each bed of catalyst with at least one fluid reactant to form an effluent of each reactor;
 - c) maintaining each catalyst bed at isothermal conditions by fluidizing each bed of catalyst using a fluid selected from the group consisting of said reactant, another fluid, or a mixture thereof; and
 - d) analyzing each of the effluents.
- 22) The process of Claim 21 wherein the isothermal conditions are substantially identical for each of the beds of catalyst.
- 23) The process of Claim 21 wherein the isothermal conditions are different for at least two of the beds of catalyst.
- 24) A process for evaluating the performance of a plurality of solid particle catalysts comprising:
- a) containing the plurality of solid particle catalysts in an array of parallel reactors with each reactor containing a bed of catalyst;
 - b) contacting, simultaneously, at reaction conditions and two-phase operating conditions, each bed of catalyst with at least one fluid reactant to form an effluent of each reactor;

c) maintaining the desired pressure drop across the beds of solid catalyst particles regardless of differences between beds by fluidizing each bed of catalyst using a fluid selected from the group consisting of said reactant, another fluid, or a mixture thereof; and

5 d) analyzing each of the effluents.

25) The process of Claim 24 wherein maintaining the desired pressure drop across the beds of solid catalyst particles also operates to maintain the desired reactant fluid flow through the beds of solid catalyst particles.

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